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## **Lesson 22 - The Principles Of Digestive Physiology Which Decree Correct Food Combining**

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1. The Basis Of The Food Combining System

### **1. The Basis Of The Food Combining System**

The food combining system, as a whole, is simple and easy to understand. It logically evolved from the study of gastric physiology and the actions of enzymes and digestive juices. Hygienic food selection and the principles of food combining are based on the nutritional needs of humans and the limitations of our digestive systems. It is not what we eat, but what we digest and assimilate, that determines the nourishment our bodies receive. Food combining is based on the discovery that certain combinations of food may be digested with greater ease and efficiency than others.

Correct food combinations result in an immediate improvement in health by lightening the load of the digestive organs. Better nutrition is assured, and there is better digestion, less fermentation and putrefaction, more comfort, less distress and less gas. So-called food allergies often disappear as a result of proper food combining. (See article in the Case History section of this lesson. This article was written by Richard Hill, a young man who had to learn the hard way.)

Fermentation causes irritation and poisoning. Proper food combining removes fermentation as a cause of indigestion (though there are many other conditions that can cause digestive problems, such as overeating; eating hurriedly or when tired, worried, angry, fearful, grieved, etc.; or when you are in pain or have a fever or inflammation).

The successful results obtained through the utilization of the food combining rules can be explained and substantiated by the facts of physiological chemistry, particularly the chemistry of digestion.

No food program, nor any food combining program, will cure disease. Healing can be effected only by removal of the causes of disease. Incorrect food combinations can be an important cause.

## 2. What Is Food?

### 2. What Is Food?

Food is any substance which is eventually convertible into such end-products as tissues, body fluids, etc., and can be utilized by the organism in the performance of its functions. To be correctly classified as a food, a substance must:

1. Be capable of liberating energy when oxidized;
2. Be capable of being utilized for growth, maintenance and repair;
3. Be capable of being stored within the body and
4. Produce no nutritionally significant toxic effects

For example, some plants contain large amounts of oxalic acid (see definition) and should not be used as food. Many plants which contain smaller (nutritionally insignificant) amounts of oxalic acid are excellent foods. On the other hand, tobacco, which is a plant, contains proteins, carbohydrates, minerals, vitamins and water, which are the constituents of food. But tobacco also contains considerable quantities of poisons. Dr. Shelton says that one of these is one of the most virulent poisons known to science. Therefore, tobacco cannot be a food.

Nutrients in foods are chemical substances of known composition and structure, classified as carbohydrates (such as sugar, starch and glycogen); lipids (fats); proteins (amino acids linked together); salts (minerals); and vitamins, needed in small quantities (or, traces) by the body. In addition, foods contain indigestible materials—cellulose (fiber).

Water, oxygen and vitamins, together with proteins, carbohydrates, fats and minerals, form the constituents of the body—the blood, tissue, bones, organs, muscles and so forth. Foods must be taken into the digestive tract and prepared for use by the organism before their constituents may be used by the body.

### 2.1 The Best Food Is Raw Food

In our discussion of food combining, cooked foods and flesh foods will be mentioned. Uncooked foods from the plant kingdom constitute the ideal Hygienic diet, for those not yet ready to use exclusively raw plant foods, information on food combining of other foods is included.

People with impaired digestion may have been advised to avoid raw food. If serious pathological conditions exist, or if there are organic limitations caused by surgery, it would probably be advisable for such people to seek the help of a Hygienic doctor. Most such people can be helped by Natural Hygiene, but some of them may need careful supervision in changing from conventional eating and living patterns.

People whose digestive impairments limit the use of uncooked food should utilize raw foods to whatever extent they can while they aim for restoration of as much normal function as possible. The rational approach to such restoration of normal function is not drugs or surgery, but rest and fasting, followed by a gradual implementation of improved eating and living practices, adapted to the limitations of that individual.

The goal should be the gradual achievement of a diet predominating in uncooked foods, because the nutrients available in raw foods are several hundred percent greater than those remaining after food has been cooked or otherwise processed. *More details about the damage done by cutting, cooking, seasoning and flavoring food will be given in future lessons.*

Raw foods improve the total inner environment. Sluggish bowels begin to move, eventually cleaning out waste that may have been lodged in the folds of the intestine for months. The layer of mucus that forms

in the intestines when cooked food predominates is removed, greatly increasing efficiency in the absorption of nutrients. Food wastes don't stay in the bowel long enough to putrefy. The transit time of raw food in a healthy body is 20 to 24 hours, while cooked food may take three days or longer.

Many scientific researchers and medical doctors now, recognize the value of raw food, both in health maintenance and for improvement or remission in chronic illnesses.

John M. Douglass, M.D., internal medicine specialist at the Southern California Permanente Medical Group in Los Angeles says, "It's a sad commentary that we think we can compensate with a pill for all the heat-labile nutrients and enzymes that are lost in cooking." He says also that experience shows that the raw food diet works for many diabetics, although it's not always easy for them to follow and must be planned carefully.

Dr. Paul Kouchakoff, medical researcher of the Institute of Clinical Chemistry, Lausanne, Switzerland, revealed circa 1930 that after eating cooked food, the human body develops leucocytosis, the abnormal proliferation of white blood cells. Leucocytes are created and rushed to the intestine. When he fed patients on an 80 percent raw diet, no leucocytosis developed.

More details about Dr. Kouchakoff's experiments, and other reports about the phenomenally superior value of raw food, will be given in future lessons. The above preliminary information is included in this lesson so the student may, at the outset, be motivated to apply his newly-acquired knowledge of food combining principles to the best food available, which, undeniably, is food that is utilized in its unchanged raw state.

*The 80 percent raw food diet:* For those who are not yet ready, or willing, to change to an all-raw diet, a good start would be the achievement of an 80 percent raw diet. For most people, this is not difficult to achieve. It can be appetizing, interesting, varied, satisfying and economical. The information in the two lessons on food combining will contain all the details you need about utilizing both raw food and (if you use it) cooked food, so that you may work out your goal of eventually achieving an all-raw diet, even if you must take a roundabout route by first implementing the 80 percent raw diet.

The best and quickest way to achieve an 80 percent raw diet is to never eat cooked food more than once a day, and as part of only one meal. One should try for more and more days on raw food only. Even the people who are coping with digestive problems may eventually achieve these goals as they learn to apply the principles of Natural Hygiene to their own needs.

## **2.2 Food Classification**

Foods vary widely in character and nutritional constituents. In order to intelligently implement the principles of food combining, reference points are necessary. A food classification chart will be included with Lesson No. 23, listing and classifying specific foods. In this current Lesson No. 22, we will classify the broad categories in which foods can be placed. This classification of food categories will provide clarification and greater understanding of our discussion of the principles of digestive physiology and chemistry that decree correct food combining.

*Proteins:* All foods contain some protein, and the amounts of protein in different foods vary widely. We classify as protein foods those that contain a comparatively high percentage of protein—these are the concentrated protein foods. Such foods include:

1. Nuts and edible seeds
2. Soybeans
3. Animal proteins
4. Cheese
5. Eggs
6. All flesh foods (except fat)

The less concentrated proteins include avocados, olives, coconuts and milk. Combination foods (starchy

proteins, to be combined as starch) include legumes, grains, peanuts and chestnuts: Green vegetable proteins (to be combined as starch) include peas in the pod, lima and other beans in the pod, and mature green beans in the pod. Sprouts contain significant amounts of protein, especially in the early stages. (More about sprouts later in this lesson and in Lesson No. 23)

Bananas (1.1 percent) contain almost as much protein as avocados (1.3-2.2 percent) and olives (1.4 percent). Dried fruits (2-5 percent) may contain twice as much protein as avocados. Broccoli (3.6 percent), brussels sprouts (4.9 percent), collards (4.8 percent), sweet corn (3.5 percent), kale (6 percent) and a number of other vegetables contain more protein than avocados. Romaine lettuce (1.3 percent) contains valuable protein. None of these foods are classified in the protein category, but should, nevertheless, be regarded as excellent sources of protein.

*Starches:* The carbohydrates are the starches and sugars. The combination foods (starchy proteins) referred to under the protein category are classified as starches for purposes of food combining. These include dried and fresh legumes, grains, peanuts and chestnuts. The starchy vegetables are potatoes, mature corn, parsnips and salsify, as well as Jerusalem artichokes; the mildly starchy vegetables are carrots, globe artichokes, beets, winter squash and several others (complete list in the classification charts in Lesson No. 23).

*Nonstarchy and green vegetables:* Lettuce, celery, cabbage, broccoli, summer squash, turnips, green beans, kale and a long list to be found in the classification charts.

*Fats:* The recommended fats are nuts, seed and avocados. No other fats are recommended. (See charts)

*Fruits:* Divided into three categories—sweet fruits, subacid fruits and acid fruits. Bananas, persimmons, sweet grapes and fresh figs, as well as all dried fruit, are in the sweet fruit category. Sweet apples, sweet peaches, pears, sweet cherries, some grapes and several other fruits are subacid fruit. Citrus, pineapples, strawberries and all tart fruits are in the acid fruit category. (See classification charts for complete listings.)

*Tomatoes:* Acid fruit without the sugar content of other acid fruits. Used with vegetable salad or any green nonstarchy vegetables, but not at a starch meal. May be used with nuts or seeds, as well as with avocados.

*Melons:* Watermelon, canteloupe, honeydew and many others. (See charts)

*Syrups and sugars:* All kinds of sugar, syrup and honey—not recommended.

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### **3. The Chemistry And Physiology Of Digestion**

For food to be utilized by the body, it must first undergo a series of processes which we call digestion. After we perform the only really voluntary actions involved in the process of nutrition—putting the food into our mouths, chewing and swallowing—the balance of the digestive process is the function of the autonomic or involuntary nervous system.

The changes which foods undergo are largely effected by enzyme and digestive juices. The conditions under which "such action" can occur are sharply defined, and this is the logical foundation of the food combining system. Physiologists have ascertained the details of the chemistry of digestion through long and painstaking labors. It has remained for the Natural Hygienists to make practical application of this great fund of vital knowledge. Knowledge of the physiology and chemistry of digestion can lead us all

to a food program that will insure better digestion and better nutrition.

### 3.1 Enzymes

Enzymes are proteinaceous organic catalysts in all living organisms, both plant and animal. Our digestive juices contain enzymes that accelerate chemical reaction by catalytic action, without themselves being used up in the process.

Digestive enzymes can be used over and over again but eventually are replaced by the body. There are many different kinds of enzymes, and digestive enzymes are not the same as the enzymes in raw, unprocessed food. Digestive enzymes break down the complex substances we ingest into simple components that can be utilized by the body.

There are five types of digestive enzymes in the human body.

1. *Hydrolases* facilitate hydrolysis, the breakdown of substances in water within the body.
2. *Adding enzymes* build proteins by adding amino acids, one by one.
3. *Transferring enzymes* transfer organic substances from one compound to another so the body may use them in various ways.
4. *Isomerases, or rearranging enzymes*, rearrange molecules in organic substances; they also rearrange amino acid enzymes.
5. *Oxidases, or oxidizing enzymes*, are released in the presence of oxygen and rapidly bring about a change in the color of food. They act on foods in the mouth while one is masticating or whenever the food is exposed to oxygen. These enzymes are also present in apples and other fruits. They are released when the fruit is cut and react so as to rapidly bring about, a change of color to brown.

It is not necessary to memorize the names of these enzymes, but the information about the, action of the different types of digestive enzymes will help you to understand the underlying rationale of food combining.

Each digestive enzyme is specific in its action. It acts only upon one class of food substance. Each stage in the digestion of food requires the action of a different enzyme, and the various enzymes can perform their work efficiently only if the preceding work has been properly performed.

Body chemistry is, to a large extent, determined by the the food we eat. When certain foods are eaten regularly, the digestive enzymes and secretions are of a character to handle those foods. When the diet is altered, more and more of the digestive juices secreted will be of a character to digest the foods in the new diet, and less and less of the digestive juices will be of the character to digest the foods in the old diet.

The type of digestive juice fitted for the digestion of one type of food is of no value in digesting another type of food. Therefore, it is essential that food be taken in combinations that do not interfere with enzymatic action.

### 3.2 The Process of Digestion

Digestive speed and efficiency vary with individuals and circumstances. However, certain general statements can be made. Fruits pass through the stomach quickly; low-protein and low-starch vegetables also pass through the stomach rapidly, with little change; vegetables containing much starch must be retained in the stomach longer, for more thorough digestion; and proteins require a still longer time »for gastric digestion. Fruits may remain in the stomach for thirty to sixty minutes, low-protein and low-starch vegetables a little longer, concentrated starches about two hours and concentrated proteins approximately four hours. Some foods may take five or six hours or more to leave the stomach. Some examples are combination starch/protein foods like legumes (including beans), grains, cooked cabbage and flesh foods.

Most digestion occurs in the stomach and small intestine. Digestion, especially starch digestion, actually begins in the mouth, with mastication and insalivation of the food. This sends the proper signals for the release of the digestive juices suited to the character of the food eaten. Digestive juices are present in the saliva and in the gastric secretions of about five million microscopic glands in the walls of the stomach.

The digestive glands supply different enzymes and juices of varied strength and character and with specific timing, depending on the different foods ingested. The digestive juices may be more or less liquid, of varying degrees of acidity or alkalinity and with complex and elaborately contrived variations.

After food is masticated, insalivated and swallowed, gastric digestion is initiated. Involuntary movements of the stomach slowly mix the food with gastric juices secreted by the glands in the walls of the stomach. Pepsin, a protein-splitting enzyme, and hydrochloric acid are secreted, as well as lipase, a fat-splitting enzyme, mucus and diluting juice, along with other factors needed in the digestive process. An alkaline secretion protects the walls of the stomach from the acids. Mucus is a natural lubricant that is secreted by the cells of the mucous membranes lining all of the hollow organs of the body. It keeps the body tissues moist and prevents them from drying and cracking.

A brief review of the process of digestion will help in understanding the food combining rationale. Gastric secretion is continuous (except during fevers, gastric inflammation, pain or strong emotions; fasting is indicated when any of these conditions are present). Of course, gastric secretion is unnecessary when no food is taken.

Hunger and the sight, smell, taste or thought of food stimulate gastric secretion. Usually about three pints of gastric juice is secreted every twenty-four hours and about half this amount is required to digest a hearty meal. If you eat more than two hearty meals daily, your account will be overdrawn.

As the process of digestion continues in the stomach and the food is mixed with the digestive juices, water (from the body's reserve supply) is added to the mixture in a process called hydrolysis. During hydrolysis, digestive enzymes separate carbohydrates into simple sugars, and proteins into their constituent amino acids.

Since digestion is a mechanical as well as a chemical process, some cellulose is an important part of the diet. Although cellulose cannot be digested by humans (no enzyme secreted by humans is capable of splitting cellulose), it serves as bulk in the propulsion of food through the digestive tract. Cellulose also provides the bulk needed in the efficient elimination of food residues. Juices and refined foods contain little cellulose. However, too large a quantity of cellulose is also undesirable. Therefore, we should use fresh fruits and, when using vegetables, strive to obtain the young, tender vegetables, as these contain smaller amounts of cellulose.

Food residues, fibrous materials and particles not thoroughly masticated proceed on to the colon. Peristalsis (wave-like muscular contractions) propels the food mixture back and forth in the stomach. Periodically, the most liquid portion of the mixture is discharged into the duodenum where it meets a very acid fluid. The resultant semi-liquid mixture, known as chyme, then proceeds further—into the small intestine—where it meets a very alkaline mixture of pancreatic juice, additional digestive enzymes and bile. (Bile is secreted by the liver and stored in the gallbladder to be used when needed, particularly for emulsifying fats).

The intestinal glands secrete a juice containing enzymes similar to pancreatic enzymes. Virtually all absorption should occur by the time the food passes through the small intestine, and the residue proceeds into the large intestine (the colon).

Through all these processes, the peristaltic contractions continue, longitudinally and circularly, and propel the chyme along the alimentary canal. As you can see, foods are not digested when they have passed out of the stomach. A large part of the work of digestion takes place in the small intestine. But the role of gastric digestion is an important one in preparing the food for the next stage in the digestive process.

Coffee, tea and other such toxic infusions cause a premature emptying of the stomach and thus cause foods to leave the stomach before gastric digestion is complete.

Digestion is governed by physiological chemistry, and this must be considered in the planning of meals that are compatible with the physiological limitations of the digestive glands and their secretions. This lesson will help in understanding the principle that the digestion of different foods requires digestive juices of different characters.

The study of the processes of digestion reveals the specific action of the digestive enzymes, the careful timing of their secretion and the adjustment of the strength and character of the digestive secretions to the character of the food upon which they are to act. Carbohydrate foods receive a juice rich in carbohydrate-splitting enzymes, protein foods receive protein-splitting enzymes, and so forth.

### **3.3 Starch Digestion**

Starch digestion begins in the mouth with the action of the enzyme ptyalin (alpha amylase) which converts (or else begins the process of converting) starches into sugar during mastication and insalivation. The salivary secretions accompany the food to the stomach and salivary digestion of starches continues in the stomach for a long time, if the food was eaten under correct conditions.

If ptyalin is the only agent in the body capable of initiating starch digestion (and this is not certain), or whether it is simply the body's first opportunity to initiate starch digestion, we must not disregard its importance. The chewing process in the mouth should mix food with saliva, but people have the tendency to swallow the mass too quickly to permit the enzyme to complete its action. This necessitates the continuation of the salivary action in the stomach.

It is important that starches be eaten dry, not moist. So, you should eat steamed or baked potatoes dry rather than in potato soup. The eating of liquids with starches promotes the tendency to swallow moist starch without thorough mastication, insalivation and emulsification, processes that are particularly needed for the digestion of starches. Drinking liquids or eating liquidy foods softens the food artificially and may also cause you to eat more food than if you had eaten it dry. Drinking at meals dilutes the digestive juices and also prevents thorough mastication and insalivation of the food.

If the ptyalin is destroyed or its action is inhibited and the digestion of starch is interrupted, the partially digested (and probably somewhat fermented) starch proceeds to the duodenum, where further starch-splitting enzymes are secreted. Starch that escapes digestion in the stomach may later be acted upon by pancreatic and intestinal enzymes, provided too much fermentation has not already occurred. It is also very possible that the interrupted gastric digestion may never be completed.

Ptyalin requires either an alkaline or neutral medium. Ptyalin is destroyed by even a mild acid. If fruit acids—or any acids—are taken with carbohydrates, especially with such as potatoes, beans, bananas or dates, digestion will be inhibited or prevented and fermentation may occur. Oxalic acid diluted to one part in 10,000 completely arrests the action of ptyalin. Significant amounts of oxalic acid are contained in rhubarb, spinach, Swiss chard, beet greens and purslane.

The acetic acid in a teaspoonful of vinegar can suspend salivary digestion. Tannic acid (in coffee and tea) inhibits starch digestion, as do drug acids. The combination of citric, malic and oxalic acids in tomatoes (which are released and intensified by cooking) interferes drastically with starch digestion.

People take oranges and grapefruit as part of a meal that includes cereal and/or bread, later complain that they feel great distress after such a meal and conclude that they cannot eat citrus fruit. Such a conclusion is based on their experience of a wrong combination—not of a wrong food. Fermentation frequently does occur as a result of eating acids with carbohydrates. All students of food combining know that this combination produces bad effects such as gas, sour stomach (hyperacidity) and contributes to great difficulty in digesting starches.

When foods are eaten in such incompatible mixtures, and the efficiency of digestive enzymes is

inhibited, it is subjected to decomposition in the digestive tract. If the digestive enzymes cannot perform their intended functions of breaking down and hydrolyzing the food (adding water from the body's reserve supply), bacterial decomposition may occur, resulting in fermentation and the production of alcohol and acetic acid. Sugar, particularly, will readily ferment into alcohol, especially when combined with acids or protein. Natural combinations of citric acid or malic acid or other natural fruit acids combined in the whole fruit with fructose (also called levulose or fruit sugar) do not cause fermentation unless eaten with starches.

*Alcohol, acetic acids and putrefying substances* are byproducts of decomposition.

*Putrefaction* may be defined as the decomposition (as opposed to digestion) of protein matter by microorganisms, producing malodorous and toxic substances.

*Fermentation* is the decomposition of sugar and starch, and their conversion by microorganisms into carbon dioxide, alcohol and acetic acids. Dr. Shelton says that digestion reduces food to the diffusible state without depriving it of its organic qualities, while fermentation renders food diffusible by reducing it to an inorganic and useless state. Digestion puts food in a solution, but fermentation disintegrates it.

A simple way to avoid production of these poisonous substances in the digestive tract is to learn, and implement, the Hygienic rules for food combining. They are perhaps of even greater importance than food selection. Persistent adherence to food combining principles has been known to reduce, or even eliminate, many digestive, nasal, skin and other problems, even in some people who have not changed to the Hygienic diet. It is obvious that elimination of incompatible food combinations is a giant step in the right direction. Efficient digestion and good health can be possible only when we eat in such a way as to offer the least hindrance to the work of digestion.

### **3.4 Protein Digestion**

The digestion of carbohydrates is so different from that of protein that, when they are mixed in the stomach, they interfere with the digestion of each other. Protein digestion starts in the stomach and acid enzymes are secreted when protein is eaten. Proteins require an acid medium for digestion so, upon ingestion, hydrochloric acid is secreted in order to activate pepsinogen; this immediately stops the digestion of starches.

Almost all foods contain some protein but, when we speak of protein foods in our study of food combining, we are referring to concentrated proteins like nuts and seeds, cheese, flesh foods, etc. (See Classification of Foods in Lesson No. 23 for help in identifying concentrated protein foods, concentrated carbohydrate foods, etc.)

The normal digestion, absorption and metabolism of protein requires thorough mastication of food, in order to break it down for propulsion through the digestive tract, and for action by the digestive enzymes. As previously indicated, hydrochloric acid and pepsin (and other acid gastric juices) are secreted for the initial phases of protein digestion in the stomach, and other enzymes, such as trypsin, continue the digestion in the small intestine in a slightly alkaline medium. Protein-digesting enzymes are also secreted by the pancreas.

Before the body can use proteins, they must be reduced to their constituent amino acids (the building blocks of protein). The body must break down the complex proteins in foods and synthesize its own protein out of the amino acids. Food combining rules are of major importance in the consumption of protein, since the complexity of this food element would seem to suggest that it be eaten only under ideal conditions.

Free hydrochloric acid to the extent of only 0.003 percent is sufficient to suspend the starch-splitting action of ptyalin. Only a slight further increase in acidity not only stops the action, but destroys the enzyme. All physiologists agree that even a mild acid destroys ptyalin. It has never been shown that saliva is capable of digesting starch without the presence of ptyalin.

The function of the gastric protein-splitting enzymes, such as pepsin, are prevented by an alkali. The physiologist Stiles says, "The acid which is highly favorable to gastric digestion is quite prohibitive to salivary digestion. The power to digest proteins is manifested only with an acid reaction and is permanently lost when the mixture is made distinctly alkaline. The conditions which permit peptic digestion to take place are, therefore, precisely those which exclude the action of saliva."

The presence of undigested starch in the stomach interferes with the digestion of protein. Physiologists have shown that undigested starch absorbs pepsin, which is necessary for the digestion of protein.

Dr. Richard C. Cabot of Harvard wrote: "When we eat carbohydrates, the stomach secretes an appropriate juice, a gastric juice of different composition from that which it secretes if it finds proteins coming down."

### 3.5 Combination Foods

Single articles of food that contain starch-protein combinations (grains, legumes, and a few others) are less difficult for the body to handle than when two foods are eaten with opposite digestive needs. The body is able to adjust its juices, both as to strength and timing, to the digestive requirements of combination foods. The first response by the body is the releasing of an almost-neutral juice for digestion of the starch. After gastric digestion of starch is completed (about two hours), hydrochloric acid is secreted for digestion of the protein. The two processes do not go on simultaneously—rather, the secretions are minutely adjusted, in both character and timing, to the varying needs of the body to digest the complex food substance.

Such complex food substances are not ideal foods. They are usually cooked, and the fact that they require such complicated adjustments puts an additional strain on the body. Simple uncooked foods are easier for the body to process and offer the least hindrance to the work of digestion.

Beans: "Because of their complex character, beans, a protein-starch combination, tax the digestive powers more than simpler foods, but the gas, discomfort and other trouble that so commonly follow, eating them is not due so much to the beans themselves as to the company they keep. Baked beans are preferable to beans that are boiled and taken saturated with water. If taken thus relatively dry, well chewed and eaten in proper combinations, beans are readily digestible." This article about beans, which was published by Dr. Shelton in 1971, is evidently a somewhat revised opinion. In his Volume II of *The Hygienic System*, published in 1935, he suggested that beans should not be used.

I personally was formerly unable to tolerate lentils or beans of any kind, even when sprouted. I eliminated all legumes from my diet for about six months, after which I carefully experimented with small amounts, properly combined, until I seemed to build up my ability to digest them. Today I can eat sizeable servings of cooked or sprouted legumes (which I seldom do) and I have no problem with them.

### 3.6 Foods with Different Digestive Requirements

When two foods are eaten that have different or even opposite, digestive needs, the precise adjustment of digestive juices to meet requirements becomes impossible. Eating proteins with carbohydrates (sugar or starch) produces the same abortive situation as combining acids with carbohydrates, since protein digestion requires the secretion of acid enzymes and juices. All acids, including those in food and the acid protein-digesting juices, destroy ptyalin, the starch-digesting enzyme.

Arther Cason, M.D., D.P.H., F.R.S.A. (London), writing in the April, 1945 issue of *Physical Culture*, mentions two groups of experiments made by him and his aides which showed that eating protein and carbohydrate at the same meal retards and even prevents digestion. He made control tests in which digestive rates were recorded, and a final analysis of the feces was made. He says, "Such tests always reveal that the digestion of proteins when mixed with starches is retarded in the stomach; the degree varying in different individuals, and also in the particular protein or starch ingested. An examination of

the fecal matter reveals both undigested starch granules and protein shreds and fibers, whereas, when ingested separately, each goes to a conclusion."

As indicated by Dr. Cason, there is an individual variation in the response to certain food combinations. This would seem to account for the fact that certain people exhibit overt symptoms from the use of certain food combinations, while others do not. However, the mere fact that overt symptoms are not observed is not proof, per se, that the food is being properly utilized.

Potatoes are said to be the least objectionable of any starch to be used with protein. Dr. Shelton is of the opinion that it is the rapidity with which potato starch digests that makes its combination with protein less objectionable than the combination of other starches with protein. Potato starch digests in ten minutes under ideal conditions and it would seem that the potato starch digests before the gastric juice can accumulate in quantity sufficient to interfere.

Even so, Hygienists have rarely been observed to use potatoes with nuts—either potatoes or nuts are so satisfactory as, an accompaniment to a salad that most of us would ask, "Why would we need both?"

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## 4. Food Combining Rules

### 4.1 Acid-Starch Combinations and Protein-Carbohydrate Combinations

The preceding discussion leads up to the presentation of the first two food combining rules, which I consider to be by far the most important of all these rules and the ones which should be thoroughly understood and implemented at all possible times.

1. *Never eat carbohydrate foods and acid foods at the same meal.*
2. *Never eat a concentrated protein and a concentrated carbohydrate at the same meal.*

The purpose of this lesson is to help you to understand the reasons for these rules; Lesson No. 23 will help you to learn to implement them.

### 4.2 Protein-Protein Combinations

3. *Never consume two concentrated proteins at the same meal.*

Two concentrated proteins of different character and composition (such as nuts and cheese) should not be combined. Gastric acidity, type, strength and timing of secretions for various proteins are not uniform. Since concentrated protein is more difficult to digest than other food elements, incompatible combinations of two different concentrated proteins should be avoided. Some people with impaired digestions find it necessary to limit themselves to only one variety of nuts/and or seeds at a sitting, but other people may find, upon experimentation, that two or three varieties of nuts or seeds may be used at the same meal, if desired.

### 4.3 Protein-Fat Combinations

4. *Do not consume fats with proteins.*

Our need for concentrated fat is small and most protein foods already contain a good deal of fat. Most nuts contain about 10 percent to 20 percent protein, and about 45 percent to 70 percent fat. Avocados

contain about 1.3 percent protein (Florida varieties) to about 2.2 percent or a little more (California varieties) and 11 percent to 17 percent fat. Most other protein foods are high in fat, including cheese, eggs and flesh foods. The only protein foods not high in fat are legumes, skim milk cheese and lean meat.

Fat has an inhibiting influence on digestive secretion and lessens the amount and activity of pepsin and hydrochloric acid, necessary for the digestion of protein. The fat may lower the entire digestive tone more than 50 percent. Since most proteins already contain a good deal of fat, it would certainly be contraindicated to add more to the meal.

#### **4.4 Fats in Combination with Other Foods**

##### *5. Use fats sparingly.*

Fats also delay the digestion of other foods and, if used with starch, it will delay the passage of the starch from the stomach into the intestine. Fat not only inhibits the secretion of gastric juice—it also inhibits the physical actions of the stomach. Too much fat taken with a meal results in acid eructations and a burning sensation in the throat. When fats (avocados or nuts) are eaten with green vegetables, preferably raw, the inhibiting effect of fats on gastric secretion is counteracted and digestion proceeds quite normally. The use of fat (avocados) with starch is considered acceptable, provided a green salad is included in the meal.

*Avocados:* Though not a high-protein food, avocados contain more protein than milk. They are high in fat and the small percentage of protein they do contain is of high biological value. They are best used with a salad meal. Since they are so high in fat that they tend to slow down the digestion of foods normally requiring a shorter digestion time, they are perhaps only a fair combination with subacid and acid fruit. They are usually considered a poor combination with sweet fruit, especially *dried* sweet fruit. However, let us consider some recent work on this subject.

In an article on this topic, Dr. Vetrano says that exceptions may sometimes be made in combining avocados with fresh sweet fruit, such as bananas, but that avocados should not be combined with dried sweet fruit, unless it has been soaked overnight. She also says, "Eating avocados with salad enhances their digestion. The next best combination for the avocado is taking it with subacid or acid fruit. The fat in the food does not seem to interfere with the emptying time of the stomach and we have excellent results with this combination. The protein, which is about 2.1 to 2.5 percent, is not sufficient to interfere with the digestion of fruit. It is even better when lettuce leaves and celery are eaten with the fruit and avocado. By diluting the fats and the sugars with the lettuce, the emptying time of the stomach is not depressed.

Those who have weak stomachs with poor muscle tone would probably do better by taking avocado only with vegetable salads. If lettuce is taken with a sweet fresh fruit and avocado, even these digest well. It is probably best to never combine avocado with sweet dried fruit unless it is just a small amount of both eaten with a great deal of vegetables."

Since the avocado is low in protein, it may also be used with potatoes or other starch foods. Some people like to use avocado with the potato instead of using butter. However, I must reiterate, the best way to use avocado is with the salad.

Avocados should never be used with nuts, which are also high in fat, nor should they be used with melons.

The only fats we have considered here are nuts (a protein/fat food) and avocados (a low-protein/fat food). Other fats will be listed in the food classification chart in Lesson 23, but they are not recommended for regular use. Most of them should never be used.

## 4.5 Acid-Protein Combinations

### 6. *Do not eat acid fruits with proteins.*

Citrus, (tomatoes: see discussion), pineapple, strawberries and other acid fruits should not be eaten with nuts, cheese, eggs or meat. Acid fruits inhibit the flow of gastric juice. The digestion of protein requires an unhampered flow.

This is one rule that has given rise to some disagreement and controversy. Although Dr. Shelton includes in this rule the prohibition of citrus and tomatoes with nuts and cheese, he goes on to say that nuts and fresh cheese do not decompose when used with acids, but have their digestion delayed. He also says that acids do not inhibit the flow of gastric juice any more than does the oil of nuts or the cream of cheese.

Many Hygienists use tomatoes with nuts and believe they cause no problem. Citrus fruits present a different situation, due to the sugar in the fruit, which can ferment if its digestion is delayed by the nuts. Various experiments with the use of citrus fruits combined with nuts have produced differing results. Some Hygienists continue to use citrus with nuts.

If sweet oranges are used at the same meal with nuts, the precaution of waiting thirty to sixty minutes after eating the citrus is sometimes observed. Grapefruit might be better suited to combining with nuts, since it usually has a much lower sugar content.

Citrus fruit is best used alone but may be combined with other acid fruits; nuts are best used with salad.

Dr. Shelton modified this rule somewhat on Page 52 of *Food Combining Made Easy*: "Although green vegetables form the ideal combination with nuts, acid fruits form a fair combination with these foods and may be taken with them."

Dr. Percy Howe, of Harvard, says: "Many people who cannot eat oranges at a meal derive great benefit from eating them fifteen to thirty minutes before the meal."

Dr. Vetrano is convinced from her experience at the Health School that nuts should not be used with citrus fruit and she discontinued this practice some years ago.

A corollary of this same subject is the use of some subacid fruits with nuts or cheese—primarily tart or semi-sweet apples, although some other fruits which are usually considered subacid are sometimes used in this way. The same principles would apply as with the use of oranges with nuts, provided the sweeter subacid fruits, such as Delicious apples, are not used.

Such acid-protein combinations as sour salad dressings and acid fruit drinks used at conventional meals serve as a check to hydrochloric secretion.

## 4.6 Sugar with Starch, Protein and Acid Fruit

### 7. *Do not combine sweet fruits with foods that require a long digestive time—foods such as proteins, starches and acid fruits.*

The sugars in sweet fruit should be free to leave the stomach quickly, in perhaps fifteen or twenty minutes, and are apt to ferment if digestion is delayed by mixture with other foods.

Sugar-starch combinations cause additional problems.

When sugar is taken, the mouth quickly fills with saliva, but no ptyalin is present. Ptyalin is essential for starch digestion. If starch is disguised by sugar, honey, molasses, syrup or sweet fruit, the signals are scrambled and digestion is impaired.

Monosaccharides and disaccharides ferment more quickly than polysaccharides. (See definitions) No digestion of sugars takes place in the mouth or stomach; fermentation is inevitable if sugars of any kind are delayed in the stomach awaiting the digestion of starch, protein or acid fruit.

Sugar also has a marked inhibiting effect on the flow of gastric juice and on gastric motility. No other

food depresses the action of the stomach and the desire for food as does sugar.

#### **4.7 Starch-Starch Combinations**

*8. Eat but one concentrated starch at a meal.*

This rule is probably more important as a means of avoiding the overeating of starches than as a means of avoiding bad combinations. But it is true that starch foods may differ greatly. If two different starches are eaten together in small quantities, this is thought to not cause problems.

Slightly starchy vegetables may be combined with more starchy vegetables (e.g. carrots with potatoes), but not with combination foods (starch/protein foods) such as grains and legumes.

#### **4.8 Acid Fruits, Subacid Fruits, Sweet Fruits**

*9. Acid fruits may be used with subacid fruits.*

This is an acceptable combination, though some subacid fruits are rather high in sugar and the acid fruit may delay the sugar's normally quick exit from the stomach. However, there is no sharp line of division between the acid and subacid fruits. If combining subacid fruit with acid fruit, it is better to use only the less subacid fruit.

The acid fruits are those with the tart flavors, for example, citrus, pineapple, strawberries, and certain varieties of apples and other fruits. Tomatoes are also considered acid fruit (without the sugar content of other acid fruit). Tomatoes should not be combined with subacid fruit, nor any other kinds of fruit.

They are best combined with the salad at a meal at which no starchy foods are served. Do not use acid fruits with sweet fruits, as previously indicated.

Acid fruits are best used alone (a single variety), but if used in combination with other acid fruits, this is considered an acceptable combination.

*10. Subacid fruits may be used with sweet fruits.*

There is no sharp line of division between subacid fruits and sweet fruits. When using subacid fruits with sweet fruits, it is best to use the sweeter varieties of subacid fruit. The subacid fruits are those that possess a slightly acid flavor (but not tart), such as pears, certain apples, grapes, etc. Grapes, for example, can be acid, subacid or sweet. The sweet fruits are those that are rich in sugar and taste sweet—bananas, persimmons, sweet grapes, and so forth, and all dried fruit.

Some people prefer to eat bananas alone, but most people have no difficulty in combining them with subacid and other sweet fruit at a fruit meal. Dr. Shelton says, "While I have found that bananas combine fairly well with dates, raisins, grapes and a few other sweet fruits and with green leafy vegetables, such as lettuce and celery, I have noted that they digest best if eaten alone. This calls to mind the fact that Tilden, also, after much testing of the matter, reached the conclusion that bananas are best eaten alone."

Dried sweet fruits should be used sparingly. Use but one kind at a meal, in small amounts, combined only with subacid fruit and/or fresh sweet fruit and/or with lettuce and/or celery. Overeating of dried fruits will often bring on symptoms similar to a "cold". The sugar concentration is naturally greater in fruits which have been dried. Some dried fruits, esp. dried apricots, should be soaked overnight to replenish the missing water. Dates are usually used without soaking, figs or raisins can be used either way. If they are rather hard, soaking will soften and improve them.

Dr. Vetrano recommends using as little soaking water as possible, soaking one side at a time, so all water will be absorbed, thus avoiding losing flavor and nutrients. It is important that the water used for soaking be distilled water.

Sweet fruits combine fairly well with subacid fruits, provided the subacid fruits are on the "sweet side," for example, use Delicious apples, not Macintosh or Jonathans, with sweet fruit.

It is best to have these fruits at a fruit meal combining only with lettuce and/or celery. Since fruits are usually high in acids or sugars, they do not combine well with other foods.

#### **4.9 Fruits with Vegetables**

*11. Do not combine fruit with any vegetables except lettuce and celery.*

It is best not to combine fruits with vegetables (especially cooked vegetables), proteins or starches because if such a combination of food is eaten, the digestion of the fruit will be delayed and subject to fermentation. Lettuce and celery, however, may be combined with any fruit except melon, and will cause no problem.

Dr. Vetrano says, "Taking green uncooked vegetables with a fruit meal is perfectly all right. Even though some charts state that subacid and sweet fruits combine fair to poorly with green uncooked vegetables, the feeding practices at the Health School indicate that these are good combinations, indeed, even enhancing digestion of the fruit in some conditions of impaired digestion."

#### **4.10 Salads**

*12. Salads combine very well with proteins or starches.*

Any nonstarchy vegetables may be combined with proteins or starch, except tomatoes, which should especially not be used with starches. The green leafy vegetables combine very well with most other foods. They are excellent food and should be used in the diet.

Lettuce and other green and nonstarchy vegetables leave the stomach with little change—they pass through the stomach rapidly unless delayed by oily dressings or foods that require a more thorough gastric digestion. Lettuce and celery are good combination with fruit because all of these foods require little gastric digestion.

However, even if these vegetables are held up in the stomach with other foods, as when using salad with nuts, there is no fermentation.

Eating a large salad of fresh raw vegetables (three or four varieties) daily is an excellent practice. Dr. Shelton says, "A large bowl of salad each day is required by everyone."

#### **4.11 Take Melons Alone**

*13. Do not consume melons with any other foods.*

This rule has been somewhat under question in recent years. I personally have found that eating melons alone is an excellent practice, and have even found it advisable not to mix two different varieties of melon at the same meal.

Many people who have complained that melons did not agree with them have no trouble handling them when eating only melon at a meal. Yet, certain Hygienic professionals are offering some post-fasting people more than one variety of melon at a meal (even melons in combination with grapes or other subacid fruit) and some Hygienists follow this practice. If you want to experiment with these combinations, do it sparingly and carefully. But if you have a history of digestive problems, don't do it at all.

Melons are more than 90 percent liquid and leave the stomach quickly if not delayed and fermented by combining with other foods. Dr. Vetrano says, "Melons are best taken alone because the sugar and other nutriment are in a less stable form than the nutrients of other fruits. Orange juice may be kept in the refrigerator for an hour with little change in flavor, but if you refrigerate watermelon juice for only ten minutes, its flavor, color and composition markedly change. It decomposes much more quickly than other fruits. Consequently, if it is held in the stomach awaiting the digestion of other foods, it will

decompose (ferment) and cause a great deal of gastric distress. Eating watermelon with nuts can really be troublesome."

Dr. Shelton says, "Because of the ease with which melons decompose, they do not combine with any food, except, perhaps, with certain fruits. We always feed them alone, not between meals, but at meal time."

He also says, "It is probably a great misfortune that we do not always feel the direct effects of imprudent eating immediately following a meal. For example, there are large numbers of people who have discomfort, even great discomfort following a meal in which melons are eaten with other foods, but there are many others who do not. This latter group can see no connection between their life of imprudent eating and the breakdown of their health in later years. Their apparent impunity prompts them to defy all the same rules of life."

## 4.12 Sprouts

*14. Alfalfa sprouts may be combined as a green vegetable.*

Other sprouts should properly be classified in the same category as the original seed, even though the sprouting process has somewhat lowered the protein and carbohydrate content.

During the sprouting process, the carbohydrate and protein components of the sprouting seed tend to diminish, and the composition becomes more like a green vegetable instead of a legume, grain or seed. However, this is not uniformly the case. Sprouts which progress to the green leaf stage, such as alfalfa and mung beans, are high in chlorophyll, and alfalfa sprouts, particularly, may be freely combined as a green vegetable. Mung bean sprouts still retain enough of the property of legumes so that they are best eaten without other proteins or starches. These sprouts may be included in the low protein/starch category.

Lentils, soybeans, garbanzos and other miscellaneous beans and grains should be allowed to sprout only very briefly, until just a small sprout is showing—no longer than the seed, at most. The change in character is therefore much less than for those sprouts which are sprouted to the green leaf stage. Sprouts are high in protein in these early stages. They should therefore be classified, with some expectations, according to their original food categories, namely, as protein or combination protein/starch foods.

Sprouted sunflower seeds may, of course, continue to be classified as protein. In the case of lentil, soybean and garbanzo sprouts, they could be classified as low protein, since the starch tends to diminish and the protein remains in significant amounts in the early stages of sprouting.

I would classify sprouted grains as combination foods, their original category, to be combined as starch.

My experimentation with these sprouts, and my research on the subject, leads me to these conclusions as the best way to classify and combine them. More detailed information about sprouts and sprouting will be given in a future lesson.

## 4.13 Milk, Yogurt and Clabber

*15. Milk is best taken alone.*

This rule is included because it is one of Dr. Shelton's food combining rules, and because this lesson on food combining may be helpful to those still on a mixed diet. Hygienists do not drink milk. Adults do not need any kind of milk. Infants need their mother's milk; if this is not available, they need a substitute. (More about this in a future lesson.)

Dr. Shelton says that the use of acid fruits with milk does not cause any trouble and apparently does not conflict with its digestion. This would also apply to clabber (sour milk) or yogurt, which may be preferable to milk for adults.

Many adults (and some children) lack the enzymes lactase and rennin necessary for the digestion of milk. Lactase catalyzes the conversion of lactose (milk sugar) to the glucose and galactose which can be utilized by the body. Rennin is a milk-coagulating enzyme, which many adults no longer secrete.

This is also the reason that cheese is considered preferable to milk, although no dairy products are recommended for regular use.

The thymus gland, which also has a function involved in the digestion of dairy products, reaches its maximum development during early childhood, and usually degenerates and becomes vestigial in adults.

None of these products are recommended. If any milk products are used, they should be raw (unpasteurized) and should not be used on a regular basis. Yogurt cultures, particularly, can inhibit the body's own natural production of beneficial intestinal flora.

Dr. Shelton says that either sweet milk or sour milk (clabber) is a fair combination with acid fruit or subacid fruit, and that clabber is even a fair combination with dried sweet fruit.

Dr. Vetrano says that occasionally there are sick people with gastrointestinal problems who must temporarily be placed on milk, if they cannot take a fast of sufficient length for complete healing.

More information about the inadvisability of using fermented foods like yogurt, clabber or cheese will be included in a future lesson.

#### **4.14 Good, Fair, Poor and Bad Combinations**

When we say that foods are fair combinations, this means that they are permissible for those with unimpaired digestions. Good combinations are good for the weakest digestion.

Poor combinations should never be employed, unless, perhaps, they are used occasionally by people with the best digestions. Some combinations are so bad that no one should ever use them.

Examples of these precepts will be given in Lesson No. 23.

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5. The Crux Of Food Combining

### **5. The Crux Of Food Combining**

If we want to eat several foods at the same meal, it would seem logical that trouble could be avoided, or at least minimized, by ingesting together those foods which are compatible; that is, those which require approximately the same conditions for digestion—including length of time, type of enzymes and digestive juices, and degrees of alkalinity or acidity.

When foods are eaten in incompatible combinations and fermentation results, alcohol is produced in the digestive tract, with the same consequences as imbibing it and with the same potential for liver damage.

The existence of such a still in your body may not be illegal, but it is certainly contrary to the laws of nature!

It is important to remember that all of the senses have a role in digestion. Seeing, smelling, touching, tasting—and even thinking about food—all help in sending the proper signals for the secretion of the digestive juices and their adaptation to the character of the food.

Complicated mixtures of food interfere with this process of digestion, make it less efficient and may cause digestive problems. When we compound the problem by adding seasonings, the true taste of the

individual foods is further disguised. This makes it extremely difficult for the digestive system to supply secretions that can cope with such meals and digestion is inhibited and impaired.

The glands react to the foods eaten to the best of their ability. They interpret the signals they receive and supply the best secretions they can muster to preserve the health and the integrity of the organism. When a saturation point is reached, due to continuous bombardment from intolerable food combinations, the ability of the overworked digestive system to make the necessary adaptations is reduced or destroyed, and disease is the result.

Optimal digestion requires that we eat in such a way as to offer the least hindrance to the work of digestion by making the best use of our knowledge of the chemistry and physiology of digestion and of the limitations of the human digestive system.

Raw, fresh, whole, ripe fruit; chlorophyll-, vitamin- and mineral-rich raw, leafy green vegetable, sprouted seeds and raw, unsalted nuts and seeds are essential and valuable—they are the best of foods. Eat them in accordance with food-combining rules, masticate them thoroughly, don't complicate them with oily dressings, and your body will easily accommodate this food program and progress toward optimal health.

People with serious digestive problems should consult a Hygienic professional and probably undertake the healing that only a prolonged, supervised fast can produce. Afterwards, they too can look forward to utilization of the Hygienic food program on their way to better health.

## **5.1 Dr. Shelton's Original 9 Food Combining Rules**

1. Never eat carbohydrate foods and acid foods at the same meal.
2. Never eat a concentrated protein and a concentrated carbohydrate at the same meal.
3. Never consume two concentrated proteins at the same meal.
4. Do not consume fats with proteins.
5. Do not eat acid fruits with proteins.
6. Do not consume starches and sugars together.
7. Eat but one concentrated starch at a meal.
8. Do not consume melons with any other foods.
9. Milk is best taken alone or let alone.

## **5.2 Food Combinations Discussed in This Lesson**

1. Acid-carbohydrate combinations.
2. Protein-carbohydrate combinations.
3. Protein-protein combinations.
4. Protein-fat combinations.
5. Fats in combination with other foods.
6. Acid-protein combinations.
7. Sugar with starch, protein and acid fruit.
8. Starch-starch combinations.
9. Acid fruits with subacid fruits.
10. Subacid fruits with sweet fruits.
11. Fruits with vegetables.
12. Salads with most foods.
13. Melons best used alone.
14. Sprouts—Combinations.
15. Milk, Yogurt, Clabber—Combinations.

## 6. Question & Answers

**I've heard that food combining is an individual matter. Why can't I ignore it unless and until I have symptoms?**

That's the rationale of many people, especially people who stay on conventional diets and eat junk foods. Is it better to avoid damage to your body, or would you rather wait until damage is done, and then try to correct it? Most people already have damaged their bodies long before symptoms appear. It would be much more prudent and sensible to take the best possible care, as soon as you can, of the only body you will ever have in this life, rather than to wait until the road back is long and arduous, and when you would probably have to start with a prolonged fast.

**You say an occasional deviation is not too important. How often is occasional?**

"Occasional", or infrequent, means different things to different people. A man once said to me, "I eat meat occasionally," and when I asked him how often, he said he eats it once a day. If you do something unwise even once a week, I would call that regularly rather than infrequently. Once a month is less frequently, of course, and might be tolerated fairly well by a healthy body. Actually, the degree of harmfulness of a dietary indiscretion depends on the extent of your deviation and the state of your health. Are you speaking of bending the food combining rules, or do you mean going to a restaurant and gorging on a conventional meal? And, what is even more important, can you afford to deviate? If you are having problems, you would be foolish to do things that can only make those problems worse. For most people who feel they can "afford" to "deviate" "occasionally", it would be best to save such deviations for occasions when they find themselves in unusual situations when such a choice is the lesser evil.

**You say not to have more than one concentrated food (protein, starch, sweet fruit) at a meal. Is it all right to have some meals without any concentrated food?**

Yes, an excellent choice for the first meal of the day (for most people) is melon or juicy fruit only. Yet, some concentrated foods, especially concentrated proteins, have a place in the food program (See Mono Diets, Lesson No. 23). Starch meals are less important, and dried sweet fruit should be used sparingly. Including concentrated protein foods (usually nuts and seeds) in some of the meals enables the body to obtain a balance of the nutrients it needs. (See sample menus, Lesson No. 23)

**I seem to lose weight on an all-raw-food diet, but hold a better weight if I eat some cooked food.**

Usually, persistent adherence to an all-raw-food diet eventually results in improvement of assimilation, and one gradually puts on, and retains, more weight. However, if you have a tendency to be thin, or if some impairments cannot be completely overcome, you may have to settle for a leveling off at a weight lower than you prefer. If you feel well, the best thing to do is ignore your weight. In some instances, for emotional or physical reasons, it may be advisable to use a small percentage of cooked food. But most people will be much better off if they can decide to stay with an all-raw-food diet. Those who are convinced that they maintain better weight, feel better or have more energy if they use some cooked starches,

legumes or grains, will probably be happier on an 80-90 percent raw-food diet.

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Article #1: Skin problems? Tell me about them! By Richard Hill

### **Article #1: Skin problems? Tell me about them! By Richard Hill**

Perhaps I was vain, but having my face covered with red, or red and yellow oozing lumps made me a little self-conscious and depressed. The old platitude, "Beauty comes from the inside" sounded nice, but talking with people and FEELING their eyes on the big "honker" on my nose or that "headlight" on my chin didn't do much for my self-confidence, especially if I was talking to a girl I was hoping to impress. All this may sound like teenage trauma. But I was almost 27 years old and things were worse than ever. This wasn't my only problem. I was plagued with hay fever, migraine headaches, prostate trouble, poor vision and several other complaints. But my pizza-like complexion was my main concern and secret shame.

After 14 years of this "teenage" malady I was depressed and baffled. There was nothing I (or anyone else) could do for me. The slow but sure disfigurement I was stuck with was something I couldn't accept. Only fellow acne sufferers will understand my desperation and secret anguish. I've talked with many grossly fat people, asking if they would trade their excess weight for a chronic skin condition. So far not any would even consider it. And many of these people had contemplated suicide over their weight.

I really had given it my best shot. I had applied gallons of Clearasil, Oxy 5, 10 and 15, washed with Stridex, alcohol, witch hazel, distilled water and special skin soaps and cleansers. I washed many times a day. I was a voracious reader and tried every method and treatment I could find in those 14 long years. I was given various prescription drugs by dermatologists. The labels warned of dangerous side effects. Sometimes I would get temporary relief, usually not.

Next I tried health food store "cures." I developed a library and gathered glib knowledge from all the "experts" and their methods. I hunted down all the herbs (red clover, golden seal, cayenne, etc.) supposed to cleanse the system. I drank them from morning 'til night. I drank a half-gallon of carrot juice each day. It turned my palms orange, but did nothing for my skin. I did various other juice combinations. They did nothing. I stopped eating chocolate, nuts, fried foods, white sugar, white flour. I even gave up all fruits for a year.

I graduated from Clearasil and smeared my face with green, red and yellow clays, separately and in combinations. I took activated yeast every morning just before my vitamin ritual. I was assured my problem was a vitamin/mineral deficiency as well as an unclean system. I took megadoses of A, B complex, C (with bio-flavonoids and Rutin), D, E, folic acid, K, multi-minerals, chlorophyll, wheat germ oil, brewer's yeast, lecithin and protein powders, using my handy pocket pack. The few times I forgot caused me as much anxiety as the heart patient who forgets his nitro-glycerine.

Then I began to "fast." I took so-called "juice fasts," ones with products designed to clean out my colon. I took enemas of warm watery cold water, herb water and distilled water. I drank gallons of water to flush out my system. I tried "organic blood salts" and several other surefire cures. I was getting plenty of fresh, Los Angeles air and sunshine.

Next I got serious. I had said I'd pay a million dollars to solve my problem. Now I began to pay it on the installment plan to a young chiropractor into "natural healing." I got adjusted, x-rayed, diagnosed as having adrenal stress, given new vitamin/diet combinations. I took the glucose tolerance test and was diagnosed a hypoglycemic. (Since then I've never met anyone who took the test that was not so diagnosed!) This was the time I went on my no-sugar, no-nuts and no-fruit diet for a year.

I was as bad off as ever and switched to an older naturopath/chiropractor. He put me back on fruit, different vitamins and juices. When this didn't work he hit the problem with everything he had—more adjustments, x-rays, ultrasound, cold packs, hot packs and, finally, colonic irrigations with and without oxygen! I took these three times a week. It was expensive and embarrassing. But I was determined to get well or die trying. I was that desperate. After all the discomfort and expense my complexion was worse than ever.

I didn't give up hope. I returned to my library and came across a little book I hadn't paid too much attention to. It had seemed technical and too different. It was called *Food Combining Made Easy* by Dr. Herbert M. Shelton. Having nothing to lose, I tried this silly thing. Within a week my face started to clear up. It continued to get better. I stopped the colonics, adjustments, ultrasound and all the other things. Looking for more books by Dr. Shelton, I found *Fasting Can Save Your Life* at a health food store. I ordered more Shelton books from Natural Hygiene Press. I began to understand the basic ideas of Natural Hygiene and dove in with both feet. It was working where nothing else had. I gave away my vitamins and herbs, got back to 2 or 3 meals a day (from 5 and 6). I washed only with warm water.

I knew I had stumbled onto a new way of life and found people with no cures to sell. They had an understanding of the laws of life. They had a system where one can return to harmony with these laws and achieve total health. I made arrangements to fast under the supervision of Dr. Virginia Vetrano. I fasted at the Chateau Des Sages for 14 days. I listened to lectures and tapes and I learned more about Natural Hygiene. I wanted what these people had. I returned home with my skin more clear than it had been in 14 years. My hay fever and migraine headaches also were gone. At last my search was over and I reached the happy-ending.

I wish I could stop here saying everything was fine. But, I had more learning to do! I stayed with the Hygienic program for three months with never a pimple or snuffle. I thought I was "cured." I began to stay up late and "just this once" eat wrong food combinations. Within five months I was living worse than before I had discovered Natural Hygiene, junk foods and all. "Clear Skin!

Anything Goes!" I was headed for a fall and I fell hard. It wasn't easy to start back. But after some bad acne days, I was able to get back on the Hygienic Path. This was, in part, with the help of a certain anonymous group of overeaters. They gave me the tools to deal with the mental blank spot that precedes that first compulsive bite. Thanks to them I found my way back and everything cleared up again. I learned that I'm never "cured," but only healthy so long as I obey those Unbending Laws of Life.

I hope anyone with a similar, or any, health problem will take time to look into Natural Hygiene. I had to try everything else first. Maybe someone out there, who reads this, will be able to skip some disappointments and start in on a new, healthy life. I'll be glad to talk and write and answer questions for anyone who asks for help. This way, by passing the word along, I hope to pay back a little of the joy I have received through Natural Hygiene.

The above article is reprinted from *Naturally, the Hygienic Way*.

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## **Article #2: The Hygienic Diet By Dr. Alec Burton**

I have never liked the term "The Hygienic Diet." It implicitly suggests a diet designed for everyone which is specific, inflexible and stereotyped. Hygienically, diet represents a means of affording the organism adequate nourishment and, in order to accomplish this, there may be a thousand different diets

which will provide the necessary materials of use in adequate proportions. Diet is merely a vehicle that provides the nutrients the body requires for the maintenance of its health and life. Diet does not cure disease. Diet per se does nothing. It is passive. It is acted upon by the organism. The purpose is to secure from it the necessary nutrients the body needs for growth, development, repair of wear and tear, reproduction and the maintenance of its functions. To speak as though diet performs some function by itself is erroneous. There is no such thing as an eliminating diet, implying in some way that diet is responsible for elimination. Elimination is a physiological process; it is performed by the organism, not by the food it consumes.

A diet should consist of those materials that are essential to the organism's survival. These may be broadly classified into proteins, carbohydrates, fats, minerals and vitamins. Providing that all of these are secured in adequate amounts, in a form which is usable, the organism will have the necessary materials to work with. If they are supplied deficiently or excessively, nutritional stresses will be incurred. To the extent that they are excessive or deficient, consequences will accrue depending upon the activity of the individual organism. Obviously there are considerable limits of toleration, varying from one individual to another. The organism can tolerate slight excesses and occasional deficiencies, at these times drawing upon its own nutritional reserves, but prolonged deficiencies and substantial excesses will incur consequences of malfunction.

The means whereby the various materials that the organism requires for its health and life are supplied are not of prime importance. Of first importance is the fact they are supplied. This does not mean that we can take refined and processed foods as being good sources of the materials that we require. What it does mean is that, providing the necessary materials are available to the organism in the diet consumed, free from noxious extraneous substances, in a form which naturally occurs, not tampered with by the food refiner and processor, the organism will be securing the necessary nourishment. It is important that we get away from the idea that specific foods and specific diets have healing properties or have special properties other than the mere presence of nutrients needed by the organism. The idea that we should take beet juice for anemia, cabbage juice for ulcers or parsley for the kidneys is a vicious reactionary hangover from the medicating superstition. Nor is it desirable that we study the analyses of various foods and select our diet according to some chart which indicates that a particular food is rich in a particular nutrient. This is not good nutrition. From this practice we may learn that wholegrain cereals are rich in iron but we may not discover that the presence of phytates renders the iron unavailable to the organism.

We should attempt to secure our nutrients from a wide variety of foods although obviously not at the same meal. Over a period of time, eat as wide a variety of foods as is practicable. Introduce new foods into the diet. I am speaking here of course of natural foods and by that I mean foods that are provided by the plant or tree in nature, i.e. fresh fruit and vegetables. In fresh fruits and vegetables, I also include nuts which are botanically classified as fruits. Some of the nuts which are in common use are not, strictly speaking, nuts. The peanut is a legume. However, if we select our protein from almonds, brazils, hazels, macadamias, pecans, pine nuts, pistachios, walnuts, etc., these will supply the essential amino acids required for growth, development, repair and reproduction. To avoid any argument about the importance of taking all of the necessary amino acids at the same meal, eat a variety of nuts, but be careful not to overeat. An amount of 3 to 4 ozs. daily is quite adequate. Some additional protein will be taken in the small quantities present in fruits and vegetables. In some cases this might be quite significant. It is desirable to keep one's diet simple, not to have a wide variety of foods at a single meal, but to limit the variety to perhaps four different types together with some concentrated food such as nuts for protein.

Many people can survive quite well on two meals a day. One fruit meal and one somewhat large salad meal together with protein. This does not mean, however, that one cannot have two fruit meals or two salad meals. It may be varied as desired. Two fruit meals may be taken one day and two salad meals may be taken another day. If one is on a 3-meal-a-day program, a fruit breakfast is usually the most desirable, but there is no real objection to a salad breakfast; For the remaining two meals, these may comprise a

further two fruit meals or two salad meals, or one fruit and one salad meal. Some protein with one of the meals is desirable and I usually recommend 3 to 4 ozs. of nuts. Basically the Hygienist is arguing that the natural diet of man is comprised of fresh uncooked fruits and vegetables (which includes nuts) and insofar as he deviates from this, he increases his chances of incurring trouble. Dairy products, cheese, yogurt, milk, eggs, butter, represent compromises and if taken at all should be used sparingly. Flesh such as meat, fish and fowl represent a departure from food normal to man. The arguments in support of this are involved and extensive and it is not appropriate for me to discuss them here, but it is incumbent upon me to state categorically that flesh foods do not constitute a part of the normal diet of man. Their use then represents a compromise. The extent to which one compromises, and by this I mean the extent to which one consciously and volitionally departs from what is accepted as the ideal, is the extent to which consequences will and must follow.

Among the most dangerous and health-impairing nutritional habits, I consider the following:

- Overeating
- Eating refined and processed food
- Eating foods that have been significantly chemically manipulated
- Excessive consumption of concentrated food

I personally view the diet containing a large proportion of fresh raw fruits and vegetables accompanied by 3 to 4 ozs. of concentrated protein as being the most satisfactory. The diet may have to be manipulated in various ways, in disease and during the process of recovery. What I am here discussing represents certain basic principles of dietetics which are generally applicable to the sound and healthy. The diet of the invalid may have to be modified considerably and frequently as their strength and weakness alternate, as the energy ebbs and flows, as the needs fluctuate from day to day. Considerable knowledge and skill is required in order to feed the sick adequately without imposing nutritional burdens which prove enervating and contribute to the misery of the sufferer. In acute disease it is relatively simple: abstain from food, i.e. fast. But in the case of the chronic sufferer, the problem is far more complex. Fasting may be employed, but there are limits to its practical nutritional reserves, and the extent of the toxemic load. Very few chronic sufferers are likely to recover during a fast. The fast merely provides a foundation for the reconstruction of health and in some cases it may require several fasts to provide this foundation, and the periods of feeding in between are most crucial. Progress may be inhibited if mistakes are frequent and serious. Correct feeding after the fast in recovery from chronic disease is an extremely critical and sensitive process requiring an accurate assessment of the nutritional needs and capacities of the invalid, and whilst there can be no mathematical accuracy applied to the provision of nutrients, it must always be kept clearly in mind that we do not nourish the organism by providing nutrients but by providing foods. The organism is constructed to ingest and digest foods and thereby assimilate nutrients. We do not secure health by feeding nutrients but by providing foods which contain nutrients. The difficulty is encountered in providing the right food in the proper proportion under the correct conditions, at a time when the organism is capable of using them.

People phone me and ask "Can I eat fried potatoes? Fat and starch are all right together?" Now there are two points I wish to stress here:

1. Combinations are a refinement of food reform, not a basic principle. The rules of food combining are subordinate to eating the right food, and
2. I did not make the laws of life and I cannot make any special dispensations.

Even if I say you can eat something does not make it either good or right. Some people try to persuade me to let them eat certain foods as though I am in some way responsible for physiological processes in relation to food. When I am asked these questions I often reply "What do you think?" Then they are forced to refer to their knowledge of Hygiene which usually compels them to accept the facts of reality.

People will argue that they are in some way special, the usual laws of life have to be "bent" a little in their case. These are all the subterfuges of compromise. There are only two types which are special,

male and female. There are special periods such as infancy, pregnancy and lactation, but this does not mean that lettuce and apples are good at one time and fish and chips at another. Such periods require modifications of feeding but not of food. The exception is infancy when the infant secures his fruits, vegetables and nuts through his mother. He is eating them indirectly instead of directly.

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### **Article #3: Food Combining By Dr. Herbert M. Shelton**

Instead of confining himself to the compounds or combinations that are turned out by nature, man turns out compounds and combinations of his own, a thing that no other animal in nature does. The animal makes a meal on whatever his instincts demand at the time and does not fill up on many kinds of food at a meal. The general rule, to which there may be an occasional exception (I have failed to find one), is for them to get but one food at a meal. Even the most simple things mixed together are not as good as they would be if taken separately. For it is only thus that we can eat as little or as much of a particular food as the body demands.

We are prone to follow custom and acquired habits in our eating practices and to ignore (commonly we do not know) the inhibiting effects of a variety of conditions and circumstances upon the process of digestion. Much of the alleged scientific defense of customary eating practices is but a lingering survival of ideas formed when little was known of the process of digestion.

It was long thought that the gastric juice was the only solvent of aliment. The office of the saliva was unknown and the other digestive juices with their several enzymes were unknown long after Beaumont discovered the work of the gastric juice. Thus it came to be held that the action of the gastric juice was the same on all articles of diet. It was thought that in some manner, not then understood, bile did aid in the digestion of fats and oils.

The British health reformer, Andrew Combe, accepted the view of Beaumont that saliva is lacking in alimentary solvent. (These solvents are today called enzymes). "The agent of chymification," said Combe, "is the gastric juice." It should be noted at this point that Graham took the opposite view. He held that saliva does contain a ferment or solvent. It is a strange thing that at this late date when the importance of the work of the salivary amylase, *ptyalin*, in the digestion of starch is well known, medical writers, in attempting to discredit Graham, list his differences with Beaumont as one of his mistakes. They are determined not only to discredit Graham, but also to discount the importance of salivary digestion. Recently I read the statement that "digestion begins when food has been swallowed." Physiologists, physicians and gum-willies all seem to be determined to minimize the importance of salivary digestion. Even the importance of chewing of food in the mouth, which is a part of the digestive process, is negated.

In the effort to defend modern eating customs a number of imaginary activities are pictured as going on in the stomach. Beaumont showed long ago that the gastric juice quickly becomes intimately mixed and blended with the food in the stomach by the motions of the stomach. These continuous motions are in two directions—*transversely* and *longitudinally*. It is now customary to deny that the gastric secretion is quickly mixed with the food ingested. This denial is necessary if food combining is to be discredited. Indeed, all enzymic limitations are ignored in the effort to combat the Hygienic heresy that certain combinations of foods may be digested with greater ease and efficiency than others.

In his *Air, Food and Exercise*, Rabagliati tells of witnessing the vomiting of a salad at 5 A.M. in about the same condition it was eaten at 7:30 the preceding evening. He mentions that the salad "had rather too

much vinegar on it." Acids not only destroy ptyalin and thus stop starch digestion, but they also inhibit the secretion of gastric juice and retard protein digestion. It is the part of dietetic wisdom to avoid eating acid foods (vinegar is not a food, but a poison), with protein. Because acids destroy ptyalin, it is well to avoid eating acid foods with starches.

An acid gastric juice is required to digest proteins. An alkaline medium is required for the work of ptyalin. For these reasons, protein foods and starch foods should not be eaten together. If a natural protein-starch combination, such as beans or cereals, is eaten, the body can so adapt its digestive juices to the digestive requirements of such a food that it is digested without too much trouble. If an artificial protein-starch combination is eaten, this adaptation cannot take place. Because of their complex character, beans, a protein-starch combination, tax the digestive powers more than simpler foods, but the gas, discomfort and other trouble that so commonly follow eating them, is not due so much to the beans themselves as to the company they keep. Baked beans are, of course, preferable to beans that are boiled and taken thoroughly saturated with water. If taken thus relatively dry, well chewed and eaten in proper combinations, beans will be found to be readily digestible.

A test meal of soup, beef-steak and potatoes remained in the stomach for three hours. The same meal with sugar remained for five hours. Sugar, like acids, has a marked inhibiting effect upon the flow of gastric juice and upon gastric motility. The meal of soup, potatoes and steak was sufficiently difficult of digestion, but when the sugar was added, it became more so. In our regular eating habits we ignore, or do not know these simple facts. We tend to eat as those around us eat and we refuse to listen to the voice of those who seek to instruct us in the art of better eating. Perhaps this is the reason that it has been said that our people's favorite dessert is baking soda. I think that Alkaseltzer has now supplanted baking soda as an after-meal tid-bit, largely due, no doubt, to the fact that few homes use soda any more, since little home baking is now done.

When we were children, our mothers would not permit us to eat sugar, candy or cookies before a meal. As she expressed it, "it spoils the appetite." The fact is that no other food depresses the stomach and the desire for food as sugar does. The so-called "energy break" in mid-morning and mid-afternoon, when sugar or candy is taken to renew lagging energies, is no different from taking a coffee-break for the same purpose. This practice of taking sugar has been dignified with the high-sounding title: "The Scientific Nibble," but it is a fallacy. It is certainly a mistake to eat sugar, syrups, cakes, candies, pies, sweet fruits or honey with proteins.

Fat, like sugar and acid, also inhibits the secretion of gastric juice and the physical actions of the stomach. Too much fat taken with the meal results in acid eructations which leave a pungent, burning sensation in the throat. Fat inhibits gastric secretion. We have a great army of gastric invalids who overeat on butter and other fat, take sugar or acids with proteins and then are told by their physician that they do not have sufficient hydrochloric acid. The physician gives them hydrochloric acid to take and tells them that once this acid has been "lost" it cannot be regained. How does the physician know? Has he ever tried removing the cause of gastric hypo-secretion? Has he ever tried restoring the patient to health to see if his glands will function normally? Has he ever tried correcting the patient's eating and living habits? The answer to all of these questions is the same. He has never made such attempts. He has been content to palliate the symptoms of his patient and leave causes untouched.

People often consult us who are taking hydrochloric acid upon the advice of a physician, who has explained that there is no possibility of them ever regaining the tone of the stomach and that they will have to take the acid the rest of their lives. They are fully convinced that this is true and it is no easy task to disabuse them of the fallacy. It is true, of course, that if they have taken the acid for a prolonged period, the practice itself has resulted in so much deterioration of the gastric glands that secrete hydrochloric acid, that the chances of full recovery are greatly reduced. The practice should never be started in the first place and only the grossest kind of ignorance or criminal indifference to a sick person's welfare will ever prescribe such a treatment for the sick.

Fruits, because of their peculiar combinations, are best eaten at a fruit meal and not combined with

starches, fats or proteins. As a rule they are abundant in either acids or sugars, hence do not combine well with other foods. As they undergo very little digestion in the mouth and stomach they should not be held up in the stomach awaiting the completion of gastric digestion of other foods.

There is no sharp line of division between the acid and subacid fruits. Neither is there a sharp line of demarkation between sub-acid fruits and sweet fruits. The gradations between these classes of foods are almost imperceptible. The acid fruits are those with the most tart flavors—lemons, grapefruit, oranges, pineapple, sour apples, tomatoes, and similar fruits rich in acid. The sub-acid fruits are those that possess less acid flavors—pears, sweet apples, apricots, fresh figs, some grapes, sweet peaches, cherries and nectarines. The sweet fruits are those that are rich in sugar (sweet in taste)—persimmons, bananas, figs, dates, raisins, sweet grapes, mangoes and papayas. The avocado is a fat.

Tilden recommended eating the banana alone. He especially enjoined milk with this fruit, but said that it does not seem to go well with any other food. Although bananas do not give any special difficulty in digestion, if eaten with other sweet fruits, such as dates or sweet grapes, the same cannot be said for melons, which should be eaten alone. It is probably a great misfortune that we do not always feel the direct effects of imprudent eating immediately following a meal. For example, there are large numbers of people who have discomfort, even great discomfort following a meal in which melons are eaten with other foods; but there are many others who do not. This latter group can see no connection between their life of imprudent eating and the breakdown of their health in years. Their apparent impunity prompts them to defy all the same rules of life.

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### **Article #4: Protein-Starch Combinations by Dr. Herbert M. Shelton**

At frequent intervals, some chemist or physician comes forward with the announcement that there is nothing to the idea that people have better health if they do not combine starch and protein foods in the same meal. They are sure to tell us that laboratory experiments show that digestion is carried out almost as quickly where these foods are combined as where only one is taken at a time. They are likely to add that experiments with certain patients verify this opinion of theirs.

We have in these announcements, two groups of men invading a field and posing as authorities therein, to which they are alien. Chemists know nothing of feeding man or animal. They should stick to chemistry. Physicians are not trained in dietetics. They know nothing of feeding the well and the sick. They are trained in the black art of poisoning the sick. I will not say that they should stick to this practice, but I will say that they should cease trying to pass themselves off on the public as authorities in fields outside their own.

Of what value are their laboratory experiments? Very little. A laboratory is not a human being. It is not a human digestive tract. The laboratory experiment cannot be substituted for the actual work of digesting a meal. Even feeding test meals and pumping out the stomach contents, or viewing the stomach through the X-ray is not a satisfactory approach to the solution of the problems involved in the heterogeneous and haphazard mixtures of foods commonly consumed at a meal.

What can be learned from feeding one meal to a subject, or even from feeding a few such meals to a few subjects? One such meal may not bring any distress to the subject. Indeed, we see many people eating such meals regularly for years before they develop discomforts therefrom. But the constant repetition of heavy protein-starch meals taxes their digestion to the limit and, sooner or later, results in discomforts and diseases galore.

Dr. Tilden once pointed out that nearly all such experiments are carried out by physicians and chemists who use the potato as the starchy part of the diet, and, he adds, "I have often stated, the potato is the least objectionable of any starch to be used with protein, on account of its potash content." My own view is that the potash content of the potato is not concerned in the matter at all. Potato starch digests in ten minutes under ideal conditions. I am of the opinion that it is the rapidity with which the potato starch digests that makes its combination with protein less objectionable than the combination of other starches with protein. It seems to be that the potato starch digests before the gastric juice of the stomach can accumulate in such quantity as to materially interfere with the digestion of the starch. Whatever the true explanation, the fact still remains that potato with protein, though objectionable, is less so than some other starchy foods with protein.

The man who has fed thousands of patients, old and young, and has had an opportunity to study the effects of diets and food combinations upon the health and diseases of these people is in a far better position to judge the accuracy of the contention that protein-starch combinations are not conducive to good digestion and good health, than are the chemists who feed nobody and the physicians whose great work is that of poisoning the sick.

Those of us who have made these observations know well that correct food combinations result in an immediate improvement in health by lightening the load the digestive organs have to carry. We know that we see better digestion and less fermentation and putrefaction. We see more comfort and less distress. There is less gas and little or no odor to the gas.

I do not believe that such experiences are worth anything if they cannot be explained by correct principles. Unless they can be explained by the facts of physiological chemistry, particularly the chemistry of digestion, we may be only deluding ourselves. On the other hand, if our rules of food combining are soundly rooted in physiology, they are worthy of more than a passing notice.

It is frequently objected that nature, herself, combines starches and proteins and if nature does, we may do so also. This objection is not valid. It is based on the untenable assumption that everything in nature is *designed* or *intended* for food. The great representative examples of protein-starch combinations in nature are cereals and legumes. These are the very foods that are most prone to decompose in the digestive tract when eaten. Neither of them constitute the best of foods and neither of them is readily digested. While a diet of cereals or a diet of legumes is inadequate in several ways, there is reason to believe that some of the inadequacies that result from such dietaries are results of the failure of digestion, a failure that is probably the result of the protein-starch combination.

Physiologically, the first steps in the digestion of starches and proteins take place in opposite media—starch requiring an alkaline medium, protein requiring an acid medium in which to digest. The enzyme *ptyalin* (salivary amylase) that initiates starch digestion is active in an alkaline medium only and is destroyed by a mild acid. On the other hand, *pepsin*, the enzyme that initiates protein digestion is active only in an acid medium. If starches and proteins are eaten together, the acid gastric juice destroys the ptyalin and puts an end to salivary digestion of starch. That the presence of the undigested starch in the stomach interferes with the digestion of protein is shown by the presence of undigested protein in the stools. Physiologists have shown that undigested starch absorbs pepsin and this will surely interfere with digestion of protein.

If a food that is a natural protein-starch combination is eaten alone, the body is capable of modifying its digestive juices and timing their secretions in such ways that digestion can go on with a fair degree of efficiency. But when a starch food and a protein food are eaten at the same meal this precise adaptation of the digestive secretions to the character and digestive requirements of the food is not possible. There is a marked and important difference between eating a food that is a natural protein-starch combination and eating two foods, one a protein, the other starch.

When starches and proteins are eaten together, there is a fermentation and this results in fouling the whole digestive tract. Fermentation means irritation and poisoning. If starch is eaten without protein, the gastric (stomach) secretions will not be acid, or will be so weakly acid that they will not interfere with

salivary digestion. In this case here will be no fermentation, except from other causes, such as overeating, hurried eating, other wrong combinations, eating when fatigued, worried, angry, fearful, grieved, etc., eating immediately before beginning work, eating when in pain, fever or when there is inflammation, etc. The causes of indigestion are legion.

When the artificial protein-starch combination is eaten, not only undigested starch, but undigested protein will be found in the stools. The presence of undigested starch and protein in the stools is of far greater importance in determining the digestibility or indigestibility of a food combination than is the emptying time of the stomach. "Research" workers have found that the protein-starch combination delays the digestion of protein four to six minutes. This would seem to be unimportant, and I believe it is unimportant. If this brief delay in protein digestion represented all there is to the matter, we could forget the whole thing and continue to eat haphazardly. But starch digestion is important, also. Then there is the fact that the delay in emptying time of the stomach is no criterion of the completeness with which gastric digestion of protein has been done.

Physiologists resort to a number of "dodges" to escape the obvious implications of the facts of the physiology of digestion. A fine example of this is contained in *Physiology* by V.H. Mottram, professor of physiology at the University of London. He says that when the food in the stomach comes in contact with the gastric juice no salivary action is possible. He says: "Now gastric juice digests protein and saliva digests starch. Therefore it is obvious that for efficient digestion the meat (protein) part of a meal should come first and the starchy part second—just indeed as by instinct is usually the case. Meat precedes pudding as being the most economical procedure."

Why should it make any difference what order in which we consume the various foods at a meal? Mottram explains it in this way: "the distal end of the stomach is that in which the churning movement that mixes the food with gastric juice takes place ... But the food in the quiescent end is still under the influence of the saliva, while the food in the motile end comes into contact with the acid gastric juice and no salivary action is possible."

This means that if you eat your protein first so that it will be down in the lower end of the stomach and consume your starch last so that it will be in the upper part of the stomach, the protein will be digested below while the starch is digested above.

Assuming that there is any absolute demarkation between the food in the different parts of the stomach, and this assumption would be false, it is still not true that people in general, either instinctively or otherwise, consume their proteins and starches in this manner. Perhaps in England it is customary to eat meat at the beginning of a meal and pudding at the end, just as we have a similar practice of taking a dessert at the end of a meal in this country; but it is likely to be the practice there as here of eating bread and meat together. When the average man and woman eats flesh or eggs, or cheese, he or she takes bread with the protein. In eating hamburgers, sandwiches, hot dogs and similar dietetic abominations, it is certainly not the custom to consume the protein first and then, at the end of the "meal" eat the bun or other bread. The protein and starch are eaten together and are thoroughly mixed in the mouth in the process of chewing before they are swallowed.

For good digestion, let us eat our proteins and starches at separate meals.

### **Article #5: Basic Considerations In Food Combining By Virginia Vetrano, B.Sc.**

The Hygienic rules of food combining are based on certain facts of the physiology of digestion that are well-known to the orthodox biologist and physiologist. Although these specialists in science never make any effort to make a practical application of their knowledge to the everyday task of living, the known limitations of the digestive enzymes make it important that some consideration be given to these in our eating habits. What I have to say in the remainder of this article is based squarely upon the current teachings of standard physiologies, as I learned them in my studies of science prior to my graduation, but a few weeks ago, from the University.

The human digestive tract is divided into three cavities: the mouth, the stomach and the intestines. Each of these cavities possesses its own characteristic digestive juice or juices with which to do the digestive work of the particular cavity. Thus the work of digestion may be divided into three steps or stages, the work of each cavity preparing the food for the advanced work of the next. Although physiologists and biologists tend to think of salivary and gastric digestion as relatively unimportant, many facts, which I shall discuss in a future article, indicate that the efficiency and satisfactoriness of intestinal digestion depend upon the thoroughness with which salivary and gastric digestion have been carried out. With this thought in mind we shall begin our studies of the digestive processes.

Digestion is essentially a process whereby large molecules are broken down into smaller molecules by the process of *enzymatic hydrolysis*. Hydro (water) lysis (to loosen), means to loosen up by water, or to cleave large molecules into smaller ones by adding water. The organic catalysts (enzymes) are necessary to speed up hydrolysis. Without enzymes, very high temperatures and strong chemicals are necessary to produce hydrolysis, but these destroy food values. In the stomach hydrolysis occurs in comparatively low temperatures and in a short while. The thesis is that it takes a year or more to hydrolyze foods without enzymes. Unfortunately the end-products are never really the same. Thus we see that enzymes are of primary importance in digestion.

Without chemical digestion, the animal organism would derive no benefit from foods. The food must be reduced to the size necessary to pass through the mucous membrane of the intestine and it must be changed into substances that can be assimilated and used by the organism, such as simple sugar, resulting from carbohydrate digestion; glycerol and fatty acids, derived from the fats of our diet; and amino acids, derived from proteins. Without good digestion we rob ourselves of many important elements and permit decomposition and putrefaction which cause various and sundry troubles.

Enzymes are organic catalysts composed of complex protein; hence, the requirement of amino acids for their synthesis. (A catalyst is a chemical agent that, when added to reacting chemicals, greatly speeds up their reaction and may be recovered practically unchanged at the end of the reaction.) The vitamin molecule is also said to form part of the enzyme molecule. There are extracellular enzymes (exoenzymes), such as the digestive enzymes, and glycogenase, found in the liver, is an example. Exoenzymes are secreted from the cells that produce them, and they perform their activities outside the cell. Endoenzymes do their work inside the cells that produce them.

Each enzyme is specific in its action; by this is meant that it acts upon one class of food only (fats, carbohydrates or proteins) and upon no other, or upon one class of products of previous enzymic activity. Indeed, each one of the different sugars requires its own specific enzyme. They perform their work best at body temperature.

Each enzyme is capable of acting only in a medium of a certain pH. The pH of a substance is the measure of its acidity or alkalinity. An alkaline substance is one in which the hydroxyl ions (OH) are in excess of the hydrogen ion (H). If the hydrogen ions are in excess, the substance is acid. If the hydroxyl and hydrogen ions exist in equal concentrations, the substance is neutral. For convenience, the

physiologist expresses the concentration of hydrogen ions with the chemical symbol pH. Measuring the relative concentration of hydrogen and hydroxyl ions with the potentiometer, substances with a pH of seven are neutral, becoming increasingly acid as the pH falls from seven to one and increasingly alkaline as the pH rises from seven to fourteen.

Enzymes exist in an inactive form designated as proferment or zymogen, within the cells that produce them. Some may remain inactive until activated by *activators* (an inorganic activator) and *kinases* (organic activators). Others are converted into active enzymes at the moment of secretion. There are also coenzymes, where the action of an enzyme is dependent upon the presence of another substance as in the case of the dependence of pancreatic lipase upon bile salts. It was formerly thought that bile has an antiputrefactive action, but it is now thought that the greater amount of putrefaction of proteins and carbohydrates in the absence of bile is due to the fact that fats are not digested off the food, thus protecting them from the digestive juices. This allows the foods to undergo bacterial decomposition, the end-products of which are toxic. The above should indicate the importance of not eating fried foods and of not saturating your bread, potatoes, and other starch with butter, margarine, oil or other fat.

Food, upon being received in the mouth, is subjected to comminution and insalivation and is thus reduced to a soft mass known as a bolus. The first enzyme with which the bolus comes in contact is *ptyalin* or salivary amylase. This enzyme begins starch digestion, changing the starches to dextrine and maltose, if given sufficient time to continue its action in the stomach. I shall speak more of this later. The bolus acquires a neutral or slightly alkaline reaction that is essential to the continued action of the salivary amylase. If the saliva is distinctly acid, it immediately stops salivary digestion and the first step in converting starch into usable sugars is arrested.

After food has been masticated and insalivated, the bolus is sent through the esophagus to the stomach where gastric juice is poured out in large quantities (an average of 1.5 to 2.5 liters a day). It is a thin, colorless fluid with a definite acid reaction (pH of 0.9 to 1.7), containing protein, mucin, inorganic salts, about five percent hydrochloric acid, and the enzymes pepsin and gastric lipase. If no protein is eaten, the juice is almost neutral in reaction.

Shortly after food enters the stomach, contractions begin in the middle region, passing down to the lower end called the *pyloris*. These actions thoroughly macerate the food with the gastric juice, forming the thin liquid mass now called *chyme*. The fundus or upper end of the stomach exerts pressure on the food in it so that it constantly pushes the food further into the more active or prepyloric and pyloric end of the stomach. In thin way, all the contents of the stomach become a liquid chyme and are thoroughly mixed together. There can be no separation in the stomach of one part of the meal from the other. A blender also has the churning action only at the bottom but shortly after the motor is turned on all the contents are thoroughly and evenly mixed. The churning motion in the lower part of the stomach, the addition of an enormous amount of fluid, plus the constant pressure of the fundus, (which the blender lacks) upon the food is more than enough to ensure the thorough maceration of the food.

As previously stated, the enzymes of the stomach are pepsin, and gastric lipase. Pepsin, which initiates protein digestion, requires an acid medium in which to work. It is secreted as the zymogen pepsinogen and rendered active by the hydrochloric acid of the gastric juice. Pepsin is active only in the presence of hydrochloric acid and the hydrochloric acid may be destroyed by alkali such as baking soda, etc. Pepsin hydrolyzes proteins through several stages into proteoses and peptones, which are inabsorbable and must undergo further hydrolysis in the intestine by other proteolytic (protein splitting) enzymes.

The stomach enzyme, gastric lipase, asserts its activity upon fats, breaking them up into fatty acids and glycerols, but the action of this enzyme is inhibited by an acid medium. Physiologists believe that fats undergo little or no digestion in the stomach because of the acid gastric juice, but Hygienists have shown that, with proper combinations, fats can be digested in the stomach. The very fact that a fat-splitting enzyme is contained in the gastric juice, indicates that it is there for a purpose and, if in a medium of the right pH, it will exercise its properties. Fats and proteins are a very bad combination since proteins require a very acid medium for digestion and this would inactivate gastric lipase. Fats also inhibit gastric

secretion, it is thought possibly by the production of a hormone called enterogastrone. But where fats are eaten with green vegetables, preferably raw, the inhibiting effect of fats on gastric secretion is counteracted and protein digestion proceeds quite normally.

Salivary digestion or the action of ptyalin or salivary amylase upon starches occurs while chewing and swallowing food and for a brief time after it gets into the stomach. This is not sufficient time to complete salivary digestion. Unless starch-protein combinations are avoided, salivary digestion of starch is not completed. We have learned that pepsin, that acts on proteins, needs an acid medium in which to work, and salivary amylase, that digests starches, needs an alkaline medium. Then, if protein foods, such as nuts, cheese, etc., are eaten with starches, such as potatoes or bread, the gastric secretion will be acid because of the presence of the protein food, and will speedily bring to a halt all starch digestion in the stomach. The starchy food will be left incompletely digested until it reaches the small intestine for further hydrolysis, providing it has not undergone fermentation and decomposition. It must be remembered that it is during this waiting period, because of the temperature of the stomach, that fermentation and decomposition are most likely to occur. The end-products of bacterial decomposition are always poisonous.

When a starch is eaten alone, that is without protein, as for example, a potato, a gastric secretion, the pH of which is practically neutral, is poured into the stomach, and salivary digestion will combine in the stomach uninhibited. Other acids besides hydrochloric acid destroy salivary amylase. Free acids of fruits, such as those of oranges, grapefruit, pineapples, tomatoes, lemons, limes, sour apples, sour grapes, sour berries, etc., and the acid of vinegar as well as drug acids, destroy salivary amylase. The eating of acid fruits and the taking of vinegar-containing dressings suspends salivary digestion. The drinking of orange or tomato juice with the starchy breakfast cereals that conventional eaters consume, is hazardous.

Salivary and gastric (stomach) digestion, if carried out properly, prepares the food for intestinal digestion, where enzymes of the *succus entericus* (the secretion of the intestinal glands) and the pancreatic juice and the coenzymes of the bile take over. In the intestine, the end-products of hydrolysis are reached and the food is ready for absorption, which also takes place in the intestine.

*Succus entericus*, the intestinal secretion, contains four or five enzymes and has a marked alkaline reaction. The enzymes are as follows: *enterokinase*, which activates *trypsin* (the protein-splitting enzyme of the pancreatic juice); *erepsin*, which completes the work of *pepsin* and *trypsin*, hydrolyzing peptides to their constituent amino acids. The hydrolyzing enzymes of the *succus entericus* hydrolyze disaccharides, which are double sugars, into monosaccharides, which are simple sugars such as *glucose* and *fructose*. Without the hydrolyzing enzymes, to convert disaccharides to monosaccharides, the disaccharides would be eliminated by the kidneys because as such they are non-usable by the tissues.

Maltase acts upon maltose, and dextrine, which are products of the salivary digestion of starches. Two other hydrolyzing enzymes are *sucrase*, which hydrolyzes *sucrose* to *glucose*, and *fructose*, and *lactase*, the milk sugar enzyme. *Sucrose* is cane sugar, but it is also found in vegetables, the juices of many plants and some fruits. Most fruits contain the monosaccharides glucose and fructose. (If combined properly, fruits are the easiest of foods to digest, because their sugars are already in an assimilable form, needing no further hydrolysis. They need only to be absorbed and used.) *Lactase* acts upon milk sugar (lactose), hydrolyzing it to *glucose* and *galactose*.

Other constituents of the *succus entericus* are *nuclease*, which hydrolyzes the nucleic acid components of nucleoproteins and *secretin*, which is a hormone that I need not discuss in this short article.

Bile serves many important functions in the small intestine. It is an alkaline fluid, pH about 6.8 to 7.7, consisting of water, bile pigments, bile acids, bile salts, cholesterol, lecithin and neutral fats. Secretion of bile in the liver is continuous but it enters the duodenum only when chyme is present. Bile may be considered a coenzyme of pancreatic lipase as pancreatic lipase combined with bile splits fats more rapidly than it does alone. Bile helps in the absorption of fatty acids by combining with them, making them more soluble, hence more easily absorbed. Bile is needed in facilitating absorption of many fat

soluble vitamins, especially vitamins D, E and K. Bile has many other functions not concerned with digestion.

The pancreatic fluid enzymes are *trypsin*, pancreatic *amylase* and pancreatic *lipase*. *Trypsin* hydrolyzes proteins into proteoses, peptones and polypeptids and, given enough time, under favorable conditions, will continue its action until the necessary amino acids are reached. The more efficient and complete peptic digestion has been in the stomach, the more likely will *trypsin* and *erepsin* be able to complete the hydrolysis of proteins. Normally, proteins should be hydrolyzed into proteoses and peptones by gastric digestion. Under favorable conditions, proteins may be passed into the intestine without peptic digestion. Physiologists think that the enzyme trypsin of the pancreatic juice can initiate protein digestion and may reduce these proteins to proteoses and peptones, polypeptids, dipeptids and, finally, amino acids. It is reasonable, however, to think that thorough peptic digestion of proteins before they are expelled from the stomach assures the completion of their hydrolysis in the intestine, thus avoiding putrefaction.

The Hygienist does not agree with the thought of physiologists that salivary and gastric digestion are unimportant. The thoroughness with which enzymes do their work depends upon the amount of time they have in which to work. Obviously, therefore, thorough peptic digestion of protein will shorten the time required for the completion of protein hydrolysis in the intestine.

The several enzymes of the pancreatic and intestinal juices that complete the digestion of proteins, carbohydrates and fats in the intestine, function only in an alkaline medium. The chyme from the stomach is acid, but bile from the liver and the pancreatic juice, both of which are alkaline, quickly provide an alkaline environment for the action of the enzymes in the intestine. We need not concern ourselves with combinations, as they relate to intestinal digestion, except to point out that the best preparation for intestinal digestion is good salivary and gastric digestion. Food combining is, therefore, of greatest importance as it relates to salivary and gastric digestion.

Dr. Vetrano recommends using as little soaking water as possible, soaking one side at a time, so all water will be absorbed, thus avoiding losing flavor and nutrients. It is important that the water used for soaking be distilled water. If any water remains after soaking the fruit, you can drink the water.

Sweet fruits combine fairly well with subacid fruits, provided the subacid fruits are on the "sweet side," for example, use Delicious apples, not Macintosh, or Jonathans, with sweet fruit.

It is best to have these fruits at a fruit meal combining only with lettuce and/or celery. Since fruits are usually high in acids or sugars, they do not combine well with other foods.